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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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Development of USES Aptitude Test Battery for Napkin Packager

(paper goods) 920.885

TM 002 022

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Technical Report on Development of USES Aptitude Test Battery
For .....

Napkin Packager (paper goods) 920.885
7-68.836
B-652 or
S-372

U. S. Employment Service
in Cooperation with
Wisconsin State Employment Service

March 1966

GATB Study #2591

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Napkin Packager (paper goods) 920.885

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Napkin Packager (paper goods) 920.885 (2nd Edition DOT code 7-68.836). The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
Q - Clerical Perception	85
F - Finger Dexterity	90
M - Manual Dexterity	90

RESEARCH SUMMARY

Sample:
69 female workers employed as Napkin Packagers in Wisconsin.

Criterion:
Supervisory ratings.

Design:
Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analysis of aptitude mean scores, standard deviations, and selective efficiencies.

Concurrent Validity: Phi Coefficient = .62 ($P/2 < .0005$)

Effectiveness of Norms: Only 64% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 86% would have been good workers. 36% of the non-test-selected workers used for this study were poor workers; if the workers had been test selected with the above norms, only 14% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good workers	64%	86%
Poor workers	36%	14%

SAMPLE DESCRIPTION

Size: N = 69

Occupational Status: Employed workers

Work Setting: Workers were employed at two plants of the Wisconsin Tissue Mills located at Neenah and Menasha, Wisconsin.

Employer Selection Requirements:

Age: No fixed age requirement.

Education: No requirement.

Previous Experience: No requirement.

Tests: No tests were used.

Other: Personal interview.

Principal Activities: The work performed by each worker at the two plants is comparable to that described in the job description in the Appendix.

Minimum Experience: All workers had completed 1-2 weeks of on-the-job training required to become proficient in this job.

TABLE 2

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

	M	SD	Range	
Age (years)	29.0	13.7	18-63	-.210
Education (years)	11.0	1.6	6-12	.209
Experience (mos.)	49.8	62.5	1-234	.011

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B were administered during March 1965.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency made at approximately the same time as test data were collected. Ratings and reratings for each worker were made by the immediate supervisor with a 4-5 week interval between ratings.

Rating Scale: USES Form SP-21,"Descriptive Rating Scale" was used. The scale (see Appendix) consisted of nine items covering different aspects of job performance. Each item has five alternatives corresponding to different degrees of job proficiency.

Reliability: The correlation between the two independent ratings was .86. The final criterion score consisted of the combined scores of the two sets of ratings.

Criterion Score Distribution:		
	Possible range:	18-90
	Actual Range:	36-84
	Mean:	62.8
	Standard Deviation:	8.6

Criterion dichotomy: The criterion distribution was dichotomized into high and low groups by placing 36% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers". The criterion critical score is 59.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
Q - Clerical Perception	Necessary in observing the operation of wrapping machine and in inspecting for properly applied and sealed wrappers.
K - Motor Coordination	Necessary in removing bundles of napkins from discharge tray of napkin machine and in placing them on bed of banding machine and feed conveyor.
F - Finger Dexterity	Necessary in picking up and moving napkins from napkin machine to bander and packaging machine.
M - Manual Dexterity	Necessary in loading and operating banding and packaging machines.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Aptitude	Mean	SD	Range	r
G - General Learning Ability	91.0	14.2	59-130	.169
V - Verbal Aptitude	95.0	11.8	72-125	.030
N - Numerical Aptitude	89.8	15.4	54-117	.246*
S - Spatial Aptitude	98.5	20.4	58-153	.222
P - Form Perception	108.9	25.1	35-155	.354**
Q - Clerical Perception	110.6	18.1	68-152	.399**
K - Motor Coordination	105.0	15.7	70-134	.231
F - Finger Dexterity	101.4	20.3	53-146	.471**
M - Manual Dexterity	109.9	18.8	69-147	.459**

*significant at the .05 level
**significant at the .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important						X	X	X	X
Irrelevant			X						
Relatively High Mean					X	X			X
Relatively Low Standard Dev.	X	X							
Significant Correlation with Criterion			X		X	X		X	X
Aptitudes to be Considered for Trial Norms					P	Q		F	M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes P, Q, F, and M at trial cutting scores were able to differentiate between 64% of the sample considered good workers and the 36% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one third of the sample; for four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of Q-85, F-90 and M-90 provided the highest degree of differentiation for the occupation of Napkin Packager (paper goods) 920.885. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .62 (statistically significant at the .0005 level).

Table 6

Concurrent Validity of Test Norms, Q-85, F-90 and M-90

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	38	44
Poor Workers	19	6	25
Total	25	44	69

Phi Coefficient (ϕ) = .62 Chi Square (X^2) = 26.8

Significance Level = P/2 $<$ .0005

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation studied into OAP-33 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery.

A Phi Coefficient of .38 is obtained with the OAP-33 norms of Q-90, F-80, M-85.

SP-21
Rev. 1/66

A-P-P-E-N-D-I-X

UNITED STATES EMPLOYMENT SERVICE

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____

D. O. T. Title and Code

Directions: Please read the suggestions to raters on the back of this form and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of Worker (print) _____

(Last) (First)

Sex: Male____ Female____

Company Job Title: _____

How often do you see this worker in a work situation?

- ☐ See him at work all the time.
- ☐ See him at work several times a day.
- ☐ See him at work several times a week.
- ☐ Seldom see him in work situation.

How long have you worked with him?

- ☐ Under one month.
- ☐ One to two months.
- ☐ Three to five months
- ☐ Six months or more

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

- ☐ **1. Capable of very low work output. Can perform only at an unsatisfactory pace.**
- ☐ **2. Capable of low work output. Can perform at a slow pace.**
- ☐ **3. Capable of fair work output. Can perform at an acceptable but not a fast pace.**
- ☐ **4. Capable of high work output. Can perform at a fast pace.**
- ☐ **5. Capable of very high work output. Can perform at an unusually fast pace.**

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. Considering all the factors already rated, and only these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

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FACT SHEET

Job Title: Napkin Packager (paper goods) 920.885 (7-68.836)

Job Summary: Wraps and packages various kinds and sizes of paper napkins into precounted bundles for shipment as they come from discharge end of napkin folding and printing machines using manual and mechanical packaging equipment.

Work Performed: Reads work ticket to determine number of napkins to each individual package and the number of packages to each shipping carton or case. Removes bundle of precounted napkins from discharge tray of napkin machine using both hands. Bands together stacks of napkins, using a banding machine: loads banding machine with paper band sleeves. Places bundle of napkins on bed of banding machine and turns air lever to automatically compress napkins and slips paper sleeve over and around napkins. Steps on release pedal and removes banded bundle and places in shipping carton, using loading jig to facilitate packing of cartons if required.
Wraps and seals bundles of paper napkins in glassine display packages by means of Packaging Machine: feeds napkins into Wrapping Machine for automatic wrapping in electrically controlled machine. Positions on feed conveyor and starts machine. Observes machine operation and inspects packages to see that wrapping is properly applied and sealed. Alternates with Napkin Packager on discharge end and removes wrapped bundles and packs them into cases. Seals carton by applying glue with brush and stenciling identifying information on case. Performs a variety of related wrapping and packing tasks, such as removing and wrapping Cocktail Napkins from trimming press where edges are scalloped.

(This sheet is printed in duplicate. One copy should remain as part of the Appendix in order to complete the technical report. The other copy can be removed by employment service personnel who wish to set up separate fact sheet files.)

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